

CLAIMS:

1. A neighboring base station information update
method in a mobile communications system including a
5 plurality of base stations that transmit perch
channels and neighboring base station information, and
a mobile station that receives the neighboring base
station information, searches a perch channel in
accordance with the neighboring base station
10 information, and receives the perch channel, said
neighboring base station information update method
comprising:

in said mobile station,

a base station information capturing step of
15 capturing from a received perch channel, base station
information about the base station that transmits the
perch channel; and

a base station information transmitting step
of transmitting the base station information captured
20 in said base station information capturing step to one
of said base stations, and

in said one of said base stations,

a base station information receiving step of
receiving the base station information said mobile
25 station transmits; and

a neighboring base station information
updating step of updating the neighboring base station

information in accordance with the base station information received in said base station information receiving step.

- 5 2. The neighboring base station information update method as claimed in claim 1, wherein

the perch channel is spread into a wideband using a spreading code with a rate higher than an information rate, and in addition, is doubly spread
10 using a first spreading code set that has a cycle period equal to an information symbol period and is common to all the base stations, and a second spreading code that has a cycle period longer than the information symbol period and differs from base
15 station to base station; and

the base station information consists of a second spreading code number used by the base station and phase information about the second spreading code.

- 20 3. The neighboring base station information update method as claimed in claim 1, wherein

the perch channel is spread into a wideband using a spreading code with a rate higher than an information rate, and in addition, is doubly spread
25 using a first spreading code set that has a cycle period equal to an information symbol period and is common to all the base stations, and a second

spreading code that has a cycle period longer than the information symbol period and differs from base station to base station; and

the base station information consists of a second
5 spreading code number used by the base station.

4. The neighboring base station information update method as claimed in claim 1, wherein the base station information consists of a radio frequency of the perch
10 channel.

5. The neighboring base station information update method as claimed in ^{claim 1} ~~any one of claims 1-4~~, wherein
said one of said base stations rearranges the
15 neighboring base station information in a descending order of the number of times each base station is included in the base station information received in said base station information receiving step.

6. The neighboring base station information update method as claimed in ^{claim 1} ~~any one of claims 1-4~~, wherein
said one of said base stations rearranges the
neighboring base station information in a descending
order of handover success rate of each base station,
25 which is calculated from success or failure results of handover.

7. The neighboring base station information update method as claimed in ^{claim 1} ~~any one of claims 1-4~~, wherein said one of said base stations rearranges the neighboring base station information in a descending order of the number of handover successes of each base station.

8. The neighboring base station information update method as claimed in any one of claim 5-7, wherein said one of said mobile stations carries out perch channel search at a higher frequency for a higher priority base station, and at a lower frequency for lower priority base station.

9. The neighboring base station information update method as claimed in any one of ^{claims 5-7} ~~claim 5-8~~, wherein said one of said base stations transmits the neighboring base station information of upper N base stations, where N is a predetermined constant.

10. A mobile communications system including a plurality of base stations that transmit perch channels and neighboring base station information, and a mobile station that receives the neighboring base station information, searches a perch channel in accordance with the neighboring base station information, and receives the perch channel,

said mobile station comprising:

base station information capturing means for capturing from a received perch channel, base station information about the base station that transmits the perch channel; and

base station information transmitting means for transmitting the base station information captured by said base station information capturing means to one of said base stations, and

10 said base stations comprising:

base station information receiving means for receiving the base station information said mobile station transmits; and

neighboring base station information updating means for updating the neighboring base station information in accordance with the base station information received by said base station information receiving means.

20 11. The mobile communications system as claimed in claim 10, wherein

the perch channel is spread into a wideband using a spreading code with a rate higher than an information rate, and in addition, is doubly spread using a first spreading code set that has a cycle period equal to an information symbol period and is common to all the base stations, and a second

spreading code that has a cycle period longer than the information symbol period and differs from base station to base station; and

the base station information consists of a second
5 spreading code number used by the base station and phase information about the second spreading code.

12. The mobile communications system as claimed in claim 10, wherein

10 the perch channel is spread into a wideband using a spreading code with a rate higher than an information rate, and in addition, is doubly spread using a first spreading code set that has a cycle period equal to an information symbol period and is
15 common to all the base stations, and a second spreading code that has a cycle period longer than the information symbol period and differs from base station to base station; and

the base station information consists of a second
20 spreading code number used by the base station.

13. The mobile communications system as claimed in claim 10, wherein the base station information consists of a radio frequency of the perch channel.

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14. The mobile communications system as claimed in
Claim 10
any one of ~~claims 10-13~~, wherein said base stations

rearrange the neighboring base station information in a descending order of the number of times each base station is included in the base station information received by said base station information receiving means.

9 15. The mobile communications system as claimed in ~~any one of claims 10-13~~ ^{claim 10}, wherein said base stations rearrange the neighboring base station information in a descending order of handover success rate of each base station, which is calculated from success or failure results of handover.

9 15 16. The mobile communications system as claimed in ~~any one of claims 10-13~~ ^{claim 10}, wherein said base stations rearrange the neighboring base station information in a descending order of the number of handover successes of each base station.

20 17. The mobile communications system as claimed in any one of claim 14-16, wherein said mobile stations carry out perch channel search at a higher frequency for a higher priority base station, and at a lower frequency for lower priority base station.

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18. The mobile communications system as claimed in ~~any one of claim 14-17~~ ^{claims 14-16}, wherein said base stations

transmit the neighboring base station information of upper N base stations, where N is a predetermined constant.

- 5 19. A mobile station that searches a perch channel transmitted by a base station, and receives the perch channel, said mobile station comprising:

base station information capturing means for capturing from a received perch channel, base station
10 information about the base station that transmits the perch channel; and

base station information transmitting means for transmitting the base station information captured by said base station information capturing means to a
15 base station.

20. A base station that transmits neighboring base station information, said base station comprising:

base station information receiving means for
20 receiving the base station information a mobile station transmits; and

neighboring base station information updating means for updating the neighboring base station information in accordance with the base station
25 information received by said base station information receiving means.

21. An information management method for cell search in a mobile communications system comprising:

5 a capturing step of capturing, in a handover-source base station, phase difference information between a long period spreading code of a common control channel from said handover-source base station and a long period spreading code of a common control channel from a handover-destination base station, the phase difference information being calculated by at
10 least one mobile station that is communicating with said handover-source base station; and

15 a storing step of storing, in said handover-source base station and/or its control station, the captured phase difference information.

22. The information management method for cell search in a mobile communications system as claimed in claim 21, wherein

20 said storing step stores, in said handover-source base station and/or its control station, an average of a plurality of pieces of the phase difference information between the long period spreading code of the common control channel from said handover-source base station and the long period spreading code of the
25 common control channel from said handover-destination base station, the plurality of pieces of the phase difference information being captured from a plurality

of mobile stations that are communicating with said handover-source base station.

9 23. The information management method for cell search
5 in a mobile communications system as claimed in claim
21 ~~or 22~~, further comprising:

10 a supplying step of supplying, from a control
station that stores the phase difference information
to said base station, the phase difference information
between said base station and its neighboring base
stations from among the phase difference information
stored.

15 24. A cell search method of a mobile station
comprising:

20 a capturing step of capturing, from a base
station, phase difference information between a long
period spreading code of a common control channel of
said base station and a long period spreading code of
a common control channel of a neighboring base station
of said base station; and

a cell search step of carrying out cell search in
accordance with the phase difference information
captured.

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25. The cell search method of a mobile station as
claimed in claim 24, wherein the cell search step

carries out the cell search within a fixed time range in accordance with the phase difference information captured.

5 26. A base station comprising:

storing means for storing phase difference information between a long period spreading code of a common control channel of said base station and a long period spreading code of a common control channel of a neighboring base station of said base station, the
10 phase difference information being captured from a mobile station; and

management means for managing the phase difference information stored in said storing means.

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27. A base station comprising:

storing means for storing phase difference information between a long period spreading code of a common control channel of said base station and a long
20 period spreading code of a common control channel of a neighboring base station of said base station, the phase difference information being supplied from a control station of said base station; and

management means for managing the phase
25 difference information stored in said storing means.

28. A control station comprising:

storing means for storing phase difference
information between a long period spreading code of a
common control channel of a base station controlled by
said control station and a long period spreading code
5 of a common control channel of a neighboring base
station of said base station, the phase difference
information being captured from said base station it
controls; and

management means for managing the phase
10 difference information stored in said storing means.

29. A mobile station comprising:

phase difference information storing means for
storing phase difference information between a long
15 period spreading code of a common control channel of a
base station and a long period spreading code of a
common control channel of a neighboring base station
of said base station, the phase difference information
being captured from said base station; and

20 cell search means for carrying out cell search in
accordance with the phase difference information
stored in said storing means.

30. The mobile station as claimed in claim 29,
25 further comprising:

first long period spreading code type storing
means for storing types of long period spreading codes

of a predetermined number of base stations to be subjected to the cell search, said mobile station being notified of the types from said base station;

second long period spreading code type storing
5 means for storing types of long period spreading codes of the base stations to be subjected to the cell search, the types corresponding to the phase difference information, and said mobile station being notified of the types from said base station; and
10 comparing means for comparing information stored in said first long period spreading code type storing means with information stored in said second long period spreading code type storing means,

wherein said cell search means carries out the
15 cell search in accordance with the phase difference information in response to a compared result by said comparing means.

31. A mobile communications system including a base
20 station and a mobile station,

said base station comprising:

base station storing means for storing phase
difference information between a long period spreading
code of a common control channel of said base station
25 and a long period spreading code of a common control channel of a neighboring base station of said base station, the phase difference information being

captured from said mobile station; and

management means for managing the phase difference information stored in said storing means, and

5 said mobile station comprising:

mobile station storing means for storing the phase difference information captured from said base station; and

cell search means for carrying out cell
10 search in accordance with the phase difference information stored in said mobile station storing means.

32. A mobile communications system including a base
15 station, a control station for controlling the base station, and a mobile station,

said control station comprising:

control station storing means for storing phase difference information between a long period
20 spreading code of a common control channel of said base station and a long period spreading code of a common control channel of a neighboring base station of said base station, the phase difference information being captured from said base station; and

25 control station management means for managing the phase difference information stored in said control station storing means,

said base station comprising:

base station storing means for storing the phase difference information supplied from said control station; and

5 base station management means for managing the phase difference information stored in said base station storing means, and

said mobile station comprising:

mobile station storing means for storing the
10 phase difference information captured from said base station; and

cell search means for carrying out cell search in accordance with the phase difference information stored in said mobile station storing
15 means.